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STATEWIDE SCENT STATION SURVEY FOR SOUTH CAROLINA FURBEARERS ANNUAL REPORT

1994

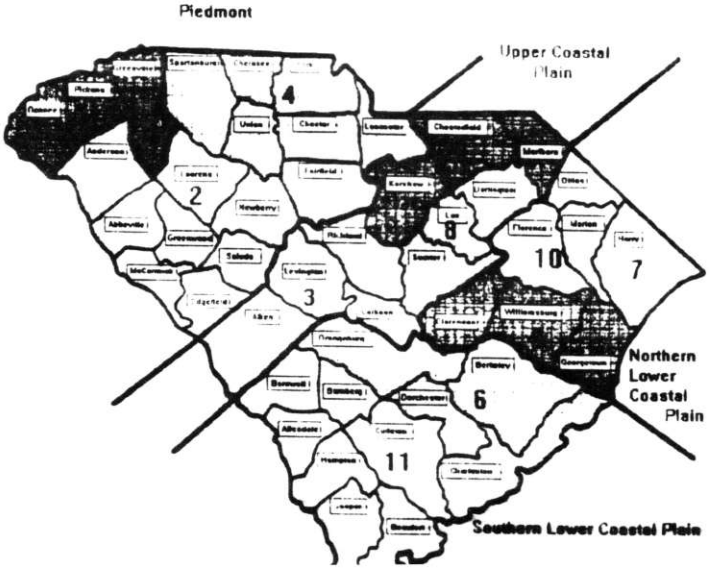
INTRODUCTION

In 1984, a statewide scent station survey was initiated in South Carolina to provide an index to the relative abundance of terrestrial furbearing animals. The survey is conducted annually, and is used along with fur harvest information to determine trends in populations of gray fox (Urocyon cinereoargenteus), red fox (Vulpes vulpes), bobcat (Felis rufus), and raccoon (Procyon lotor). Information concerning the prevalence of free-ranging dogs (Canis familiaris) also is obtained. Sixty-eight census lines were included in the initial survey, and lines have been added over the years, with the 1994 survey consisting of 162 lines. All counties in South Carolina are sampled with at least 2 lines, sampling at a rate of about 1 line per 146 square miles. The data obtained from the scent station technique assists in making sound management decisions regarding the furbearer resource. This information is also used to partially fulfill annual requirements to the U. S. Fish and Wildlife Service for obtaining federal export approval for bobcat pelts as outlined by the Convention on International Trade of Endangered Species (CITES).

METHODS

For the purpose of this survey, South Carolina is divided into 4 physiographic regions reflecting broad habitat differences (Fig. 1). These Furbearer management regions and the approximate percentage of the state's total land area in each region are: Piedmont - 35%, Upper Coastal Plain - 22%, Northern Lower Coastal Plain - 17%, and Southern Lower Coastal Plain - 26%.

Figure 1. Furbearer management regions of South Carolina.



A scent station survey line consists of 10 stations spaced at intervals of 0.2 miles. Individual scent stations within a line are constructed by removing all vegetation and loosening the soil within a circular area about 3 feet in diameter. Stations are located within 10 feet of the road shoulder, raked smooth and uniformly covered with sifted agricultural lime to create a smooth tracking medium. A scented plaster tablet is placed in the center of the station as an attractant. Commercially prepared "Fatty Acid Scent" discs purchased from the U. S. Fish and Wildlife Service are used.

Survey routes are located on county dirt roads as well as U. S. Forest Service and other primitive roads. Survey lines were originally located by field biologists and technicians in areas generally free of heavy traffic and residential development. The scent station survey is conducted on the same roads each year unless development or other factors necessitate relocation of a line.

Scent station lines are constructed in the afternoon and checked the following morning. Cooperators record visitation by gray and red fox, bobcat, raccoon, and feral dog. Stations destroyed by rain, vehicles or other disturbance are recorded as inoperative. Each survey line is operated for only 1 night, between September 24 and October 24.

Scent station indices are calculated by the formula: total number of stations visited by a species/number of operative stations x 1000. For example, 3 stations visited by bobcat/10 operative stations x 1000 = an index of 300 for bobcat on that particular line. Average scent station indices for each species were compiled by physiographic region and statewide. Paired-difference testing was used to determine differences between years for each species by physiographic region and statewide. Eleven-year mean indices for each species were calculated regionally and tested for significant differences with Duncan's New Multiple Range procedure.

RESULTS

Table 1 shows the land area and survey route density for the four Furbearer Management Regions in South Carolina. Survey route density is greatest in the Piedmont, and much lower in the Lower Coastal Plain regions.

Statewide, visitation to scent stations continues to be highest for gray fox. Indices for all surveyed species with the exception of raccoon increased slightly in 1994 (Table 2). The only statistically significant change in scent station visitation within regions was for feral dog in the Piedmont Region, where visitation was nearly twice as high as in 1993 (Table 3). Though not statistically significant, gray fox visitation increased in all regions of the state. Red fox

visitation decreased slightly in the Upper Coastal Plain region and increased slightly in other regions. Bobcat visitation showed slight declines in the Piedmont and Upper Coastal Plain, but increased in the Lower Coastal Plain regions.

Raccoon visitation rates in the Piedmont are noticeably lower than in other regions, and remained essentially the same in 1994 as in 1993. the Northern Lower Coastal Plain region showed a slight increase in raccoon visitation in 1994, while scent station visitation by raccoons decreased in the Upper Coastal Plain and the Southern Lower Coastal Plain regions. Feral dogs demonstrated increased scent station visitation in all regions except the Upper Coastal Plain Region.

Table 1. Approximate land area and Scent Station Survey route density for furbearer managment regions in South Carolina.

REGION	LAND AREA	SURVEY LINES	ROUTE DENSITY
Piedmont	7672 mi^2	71	1/108 mi^2
Upper Coastal Plain	4822 mi^2	33	1/146 mi^2
Northern Lower Coastal Plain	3726 mi^2	18	1/207 mi^2
Southern Lower Coastal Plain	5699 mi^2	28	1/203 mi^2

Table 2. Statewide mean furbearer scent station indices (standard error) for South Carolina, 1984-1994.

YEAR	#LINES	GRAY FOX	RED FOX	BOBCAT	RACCOON	FERAL DOG
1984	68	135.7(20.7)	26.5(8.0)	31.6(8.4)	61.2(11.9)	67.0(15.7)
1985	78	130.1(15.5)	34.8(9.1)	49.6(11.8)	74.3(15.5)	75.1(15.9)
1986	135	*213.0(17.4)	31.7(5.9)	36.9(6.6)	85.8(11.8)	63.0(9.6)
1987	151	251.2(18.7)	39.3(7.0)	42.6(8.1)	105.3(13.5)	71.7(9.8)
1988	158	252.6(18.1)	31.8(5.9)	34.0(6.2)	93.3(11.6)	77.2(10.2)
1989	153	245.4(17.9)	48.4(7.1)	33.0(7.2)	92.9(12.2)	95.4(13.5)
1990	159	281.2(19.0)	34.2(8.1)	26.6(5.4)	86.9(11.6)	*52.8(8.1)
1991	156	*233.4(16.7)	37.3(6.5)	26.4(5.0)	66.5(8.3)	62.9(9.2)
1992	139	249.5(19.1)	25.3(4.7)	29.3(7.3)	85.3(12.6)	54.8(9.0)
1993	153	*168.2(15.5)	29.8(5.9)	24.3(5.6)	76.7(10.5)	60.8(9.6)
1994	150	197.5(16.2)	34.4(7.1)	25.1(4.4)	66.2(8.9)	85.7(10.9)

*Significantly different ($P<0.05$) from previous year

Table 3. Mean furbearer scent station indices (standard error) by region for South Carolina, 1984-1994.

REGION	#LINES	GRAY FOX	RED FOX	BOBCAT	RACCOON	FERAL DOG
PIEDMONT REGION						
1984	21	176.2(45.7)	9.5(6.6)	0.0(0.0)	23.8(11.8)	23.8(13.6)
1985	22	108.3(26.8)	32.3(19.1)	4.5(4.5)	14.8(8.2)	39.0(15.0)
1986	58	*218.8(26.7)	24.7(6.9)	17.8(5.2)	28.5(7.7)	73.8(15.9)
1987	67	243.7(27.4)	30.2(9.3)	44.8(14.2)	58.5(13.7)	56.1(11.4)
1988	71	234.3(24.5)	27.1(6.7)	35.8(7.7)	44.1(9.4)	73.8(14.5)
1989	70	284.7(26.3)	*63.4(11.5)	26.0(7.8)	55.1(10.2)	79.8(18.4)
1990	74	321.7(26.1)	*29.7(10.7)	13.5(4.4)	55.9(9.5)	42.2(10.7)
1991	73	*225.8(22.1)	33.9(8.8)	23.3(6.3)	40.3(8.2)	38.5(11.3)
1992	72	250.9(25.0)	28.4(7.3)	11.4(3.8)	33.3(7.9)	31.9(9.5)
1993	73	224.8(24.7)	29.4(9.4)	18.2(6.6)	38.6(8.6)	46.5(12.4)
1994	71	233.8(25.7)	32.1(9.6)	15.8(4.4)	41.3(9.4)	*84.7(14.5)
UPPER COASTAL PLAIN REGION						
1984	23	109.8(24.3)	30.4(11.7)	37.0(16.1)	63.4(19.6)	82.6(24.1)
1985	22	147.5(28.9)	50.0(22.6)	18.2(10.7)	105.1(37.5)	107.0(29.8)
1986	27	233.5(39.1)	54.9(17.8)	55.0(19.2)	125.1(27.9)	103.3(25.8)
1987	32	263.7(38.9)	66.7(20.6)	19.9(8.7)	116.8(35.1)	54.2(17.0)
1988	34	208.0(31.7)	53.3(19.0)	11.8(9.2)	89.8(20.6)	104.9(25.2)
1989	34	197.1(35.4)	32.4(11.7)	26.5(12.2)	98.0(22.0)	124.8(29.7)
1990	32	241.7(36.5)	25.3(10.1)	6.3(4.3)	114.6(29.2)	90.9(24.6)
1991	34	230.1(30.9)	61.4(19.0)	18.0(8.0)	78.1(18.3)	102.3(23.6)
1992	32	230.2(42.7)	26.0(9.3)	27.1(11.0)	99.7(28.9)	100.3(22.9)
1993	34	*100.2(25.3)	40.4(11.0)	35.3(12.6)	108.3(28.1)	96.6(24.4)
1994	33	151.9(27.9)	34.8(13.5)	12.1(5.8)	65.3(15.1)	93.9(23.0)
NORTHERN LOWER COASTAL PLAIN REGION						
1984	11	109.1(21.1)	72.7(38.4)	54.5(28.2)	81.8(32.5)	150.5(65.3)
1985	14	107.9(39.9)	35.7(13.3)	*125.6(43.9)	96.2(31.0)	167.5(62.7)
1986	20	113.9(33.4)	52.9(21.6)	73.1(26.5)	156.6(43.6)	*56.1(22.5)
1987	20	237.6(53.8)	67.9(19.9)	74.9(27.4)	157.4(47.2)	*177.1(41.3)
1988	20	255.0(62.3)	44.9(21.7)	36.3(21.1)	117.8(47.4)	134.6(36.5)
1989	19	177.6(57.3)	66.8(26.4)	57.9(40.0)	155.8(62.4)	204.4(56.7)
1990	19	191.6(54.1)	37.8(19.2)	37.4(22.0)	74.9(42.5)	*64.2(23.3)
1991	17	139.2(51.0)	18.3(9.9)	29.4(23.9)	101.3(32.4)	134.0(35.3)
1992	10	172.2(59.9)	10.0(10.0)	10.0(10.0)	140.0(71.8)	134.4(56.4)
1993	16	119.4(40.0)	28.1(17.1)	25.0(11.2)	60.1(25.6)	107.8(34.7)
1994	18	184.4(40.9)	35.2(19.7)	48.8(17.8)	87.0(41.1)	122.0(34.6)
SOUTHERN LOWER COASTAL PLAIN REGION						
1984	13	138.5(65.6)	7.7(7.7)	53.8(21.5)	100.0(37.6)	38.5(31.1)
1985	20	150.6(32.8)	20.0(11.7)	80.6(25.8)	90.6(35.5)	15.0(10.9)
1986	30	249.3(39.9)	10.0(5.6)	*33.3(12.1)	113.7(28.7)	10.4(5.8)
1987	32	262.8(45.0)	13.2(9.2)	40.6(14.8)	159.4(30.4)	56.3(20.5)
1988	33	336.4(45.6)	12.1(5.8)	51.5(19.0)	187.9(31.9)	21.2(10.4)
1989	30	251.5(38.2)	20.0(10.1)	41.1(14.0)	135.2(31.1)	29.5(12.0)
1990	34	280.2(49.5)	50.0(26.8)	68.4(17.8)	135.3(33.7)	33.8(11.7)
1991	32	304.5(46.0)	29.7(12.9)	41.0(12.6)	95.1(23.2)	39.1(14.7)
1992	25	301.1(50.4)	21.4(8.8)	*91.2(34.2)	*194.8(39.2)	30.4(12.4)
1993	30	*133.7(30.1)	20.0(12.1)	*26.7(17.9)	142.2(31.0)	30.0(17.4)
1994	28	167.5(38.1)	39.3(21.4)	48.7(15.2)	117.3(24.7)	55.3(29.2)

*Significantly different ($P<0.05$) from previous year

Average scent station indices for 1984-1994 illustrate differences in indexed species abundance among regions (Table 4). The index mean for gray fox over the last 11 years shows a greater visitation rate in the Southern Lower Coastal Plain and Piedmont than the Upper and Northern Lower Coastal Plain regions. However, red fox mean visitation rates are greater in the Upper and Northern Lower Coastal Plain than the Southern Lower Coastal Plain region. As expected, gray fox visitation rates are highest in regions with the greatest amount of forested land while red fox visitation rates are higher in areas with more agricultural land. Mean bobcat indices are lower in the Piedmont and Upper Coastal Plain regions than both Lower Coastal Plain regions. Mean visitation rates for raccoon are lowest in the Piedmont and highest in the Southern Lower Coastal Plain. Visitation by feral dogs is lowest in the Southern Lower Coastal Plain. In 1994 coyote (Canis latrans) visits were recorded by 3 cooperators in Abbeville, Calhoun, and Sumter Counties.

Table 4. Average scent station indices for five species in South Carolina, 1984-1994.

	Physiographic Region			
Indexed Species	Piedmont	Upper Coastal Plain	Northern Lower Coastal Plain	Southern Lower Coastal Plain
Gray Fox	242.6 a	194.7 b	169.4 b	243.8 a
Red Fox	32.6 ab	43.3 a	44.0 a	23.2 b
Bobcat	21.5 b	23.6 b	52.9 a	50.9 a
Raccoon	42.6 c	96.8 b	113.7 b	136.6 a
Feral Dog	56.3 c	96.6 b	130.4 a	32.9 d

*Means within rows not followed by the same letter are significantly different ($P<0.05$), DNMRT.

Residential and commercial development can have a great impact on measures of species diversity and abundance. Thus, the number of abandoned lines also can be a measure of changes in habitat suitability for wildlife. Since 1990, 13 lines in Aiken (1), Anderson (2), Cherokee (2), Kershaw (2), Newberry (1), Saluda (2), and Williamsburg (2) have been relocated. In 1994, one line in Greenville County was abandoned because of development, one line in Anderson county was relocated because of impending development, and one line in Marlboro County was rendered inoperable because of excessive vehicle traffic. In

1994, 93% of all 162 established lines were surveyed, similar to the 94% completion rate achieved in 1993.

RECOMMENDATIONS

Terrestrial scent station surveys should be continued annually. New lines should be established in the Lower Coastal Plain regions where survey route density is lowest. However, the increase in numbers of survey routes may not be feasible under current manpower constraints. In 1995, Furbearer Project efforts related to the Scent Station Survey will focus on training of new survey cooperators and further training of survey cooperators on track identification. In light of expanding coyote populations and increased public concern about possible coyote impacts on native wildlife populations and livestock, the Furbearer Program will make a concerted effort to train Scent Station Survey cooperators in distinguishing between feral dog and coyote tracks. The data form for the Scent Station Survey has been simplified, and coyote has been added to the list of surveyed species. Additional effort will be made in 1995 to strive for a 100% survey.

Much emphasis has been placed on maintaining established scent station lines and forgoing any movement of these lines because of habitat changes such as residential development. Maintaining line integrity has become a serious problem and some lines have been moved or abandoned. All scent station cooperators are strongly urged to continue to run their current lines, but changes can be made if necessary.

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